Claims

1. A device for the separation of a component in a liquid sample prior to the detection of an analyte in said sample, said device having a substrate comprising a zone for receiving the sample, optionally a reaction zone, a transport or incubation zone connecting the receiving and reaction zone, respectively, forming a flow path on a substrate, **characterized** in that said substrate is a non-porous substrate, and at least part of said flow path consists of areas of projections substantially vertical to said surface, and having a height (H), diameter (D) and reciprocal spacing (t1, t2) such, that lateral capillary flow of said liquid sample in said zone is achieved, and where means for separation are provided adjacent to or in the zone for receiving the sample.

2. The device according to claim 1, wherein said means for separation consist of an area on the substrate having projections substantially vertical to the surface of said substrate, and having a height (H), diameter (D) and reciprocal spacing (t1, t2) such, that the compound to be separated from the sample is substantially prevented from leaving the receiving zone.

3. The device according to claim 1, wherein said receiving zone further contains means enhancing the separation capability of said means for separation.

4. The device according to claim 3, wherein said means are compounds capable of forming aggregates of said component to be separated.

5. The device according to claim 3, wherein said means are beads, derivatised with or carrying on their surface compounds capable of forming aggregates of said component to be separated.

6. The device according to claim 2, wherein said reciprocal spacing (t1, t2) is in the interval of 1 – 100 µm.

7. The device according to claim 6, wherein said spacing varies within said means for separation, forming a gradient in the direction of the flow.

8. The device according to claim 7, wherein said spacing varies from about 7 to about 1 µm.

9. The device according to any one of claims 1 to 8, wherein said receiving zone forms a basin capable of containing the part of the sample separated by the means for separation.

10. The device according to claim 1, wherein said means for separation are means having specific affinity to the component to be separated.

11. The device according to claim 10, wherein said means are compounds, soluble or dispersable in the liquid sample, predispensed in the sample receiving zone.

12. The device according to claim 10, wherein said means are projections substantially vertical to the surface of said substrate, and having a height (H), diameter (D) and reciprocal spacing (t1, t2) such, that capillary flow of the sample is possible, and said projections having, bound to their surface, agents with specific affinity to the component to be separated.

13. The device according to claim 10, wherein said means are beads having, bound to their surface, agents with specific affinity to the component to be separated.

14. The device according to claim 13, wherein said beads have a magnetic core.

15. The device according to claim 14, wherein said device comprises a magnet.

16. The device according to claim 15, wherein said magnet is a permanent magnet or an electromagnet.

17. The device according to any one of claims 10 to 16, wherein said receiving zone forms a basin capable of containing the part of the sample separated from the flow by the means for separation.

18. The device according to claim 17, wherein said magnet is positioned in the vicinity of said basin.

19. The device according to claim 1, wherein said means for separation comprise means for subjecting the sample to ultrasonic standing waves.

20. The device according to claim 19, wherein said means for subjecting the sample to ultrasonic standing waves comprise at least two ultrasonic energy sources

arranged to establish a pattern of nodes within the flow path by interference between their outputs defining a standing wave.

21. The device according to claim 19, wherein said means for subjecting the sample to ultrasonic standing waves comprise at least one ultrasonic energy source and a reflector, arranged to establish a pattern of nodes within the flow path by interference between their outputs defining a standing wave.

22. The device according to any one of claims 19 to 21, wherein said receiving zone forms a basin capable of containing the part of the sample separated by the means for separation.

23. The device according to any one of the claims above, wherein said substrate is a plastic substrate, preferably a thermoplastic substrate.

24. The device according to any one of the claims above, wherein said substrate is a silicon or glass substrate.

25. The device according to claim 5 or 13, wherein said beads are chosen among beads comprising glass, polymer, metal or combinations thereof.

26. A method for use in the detection of an analyte in a liquid sample, said detection taking place in a process on a substrate, where at least a subset of said sample is transported through capillary action from a receiving zone where said sample is added, to an optional zone where a reaction / detection takes place, said transport by capillary action defining a flow path, **characterized** in that said substrate is a non-porous substrate, at least part of said flow path consists of areas of projections substantially vertical to said surface, and having a height (H), diameter (D) and reciprocal spacing (t1,t2) such, that lateral capillary flow of said liquid sample is achieved, and that separation of unwanted components is performed without interruption of said capillary flow.

27. The method according to claim 26, wherein said separation is achieved using filtering means having projections substantially vertical to the surface of said substrate, and having a height (H), diameter (D) and reciprocal spacing (t1, t2) such, that the compound to be separated from the sample is substantially prevented from leaving the receiving zone.

28. The method according to claim 27, wherein means enhancing the separation capability of said means for separation are provided in said receiving zone.

29. The method according to claim 28, wherein said means are compounds capable of forming aggregates of said component to be separated.

30. The method according to claim 28, wherein said means are beads, derivatised with or carrying on their surface compounds capable of forming aggregates of said component to be separated.

31. The method according to claim 26, wherein said reciprocal spacing (t1, t2) is in the interval of about 1 to about 100 µm.

32. The method according to claim 31, wherein said spacing varies within said means for separation, forming a gradient in the direction of the flow.

33. The method according to claim 32, wherein said spacing varies from about 7 to about 1 µm.

34. The method according to any one of claims 26 to 33, wherein the part of the sample separated by the means for separation is contained in a basin, formed by said receiving zone.

35. The method according to claim 26, wherein said separation is enhanced by means having specific affinity to the component to be separated and said means are provided in the flow path.

36. The method according to claim 35, wherein said means are projections substantially vertical to the surface of said substrate, and having a height (H), diameter (D) and reciprocal spacing (t1, t2) such, that capillary flow of the sample is possible, and said projections are provided with, bound to their surface, agents with specific affinity to the component to be separated.

37. The method according to claim 35, wherein said means are beads having, bound to their surface, agents with specific affinity to the component to be separated.

38. The method according to claim 37, wherein said beads have a magnetic core.

39. The method according to claim 38, wherein said beads are retained or removed from the flow by a magnet arranged in or adjacent to said device.

40. The method according to claim 39, wherein said magnet is a permanent magnet or an electromagnet.

41. The method according to any one of claims 35 to 40, wherein the part of the sample separated from the flow by the means for separation is contained in a basin, formed by said receiving zone.

42. The method according to claim 41, wherein a magnet is positioned in the vicinity of said basin.

43. The method according to claim 26, wherein said separation is enhanced by subjecting the sample to ultrasonic standing waves.

44. The method according to claim 43, wherein the sample is subjected to ultrasonic standing waves by at least two ultrasonic energy sources arranged to establish a pattern of nodes by interference between their outputs defining a standing wave within the flow path.

45. The method according to claim 43, wherein the sample is subjected to ultrasonic standing waves by at least one ultrasonic energy source and a reflector, arranged to establish a pattern of nodes by interference between their outputs defining a standing wave within the flow path.

46. The method according to any one of claims 43 to 45, wherein the part of the sample separated by the means for separation is contained in a basin formed by said receiving zone.

47. The method according to any one of the claims 26 – 45 above, wherein said substrate is a plastic substrate, preferably a thermoplastic substrate.

48. The method according to any one of the claims 26 – 45 above, wherein said substrate is a silicon or glass substrate.

49. The method according to claim 29 or 30, wherein said compounds are chosen among hydrophilic groups, hydrophobic groups, positively and/or negatively charged groups, silicon oxide, carbohydrates, lectins, amino acids, macromolecules, antibodies, or combinations thereof.

50. The method according to claim 30 or 37, wherein said beads are chosen among beads comprising glass, polymer, metal or combinations thereof.

51. A method for separating a component in a sample, characterised in that a device according to any one of claims 1 – 25 is used.